

**In the Claims:**

Please cancel claims 5-13 and 16-19 without prejudice or disclaimer.

1. (Original) A gas sensor comprising:

a main pumping means for pumping-processing oxygen contained in a measurement gas introduced from external space, comprising solid electrolyte contacting with said external space, and an inner pumping electrode and an outer pumping electrode formed on inner and outer surfaces of said solid electrolyte; and

a measuring pumping means for decomposing a predetermined gas component contained in said measurement gas after being pumping-processed by said main pumping means by the aid of a catalytic action and/or electrolysis, and pumping-processing oxygen produced by said decomposition via said outer pumping electrode of said main pumping means, wherein:

a concentration of oxygen is controlled and/or the predetermined gas component is measured by allowing a pulse-shaped current to flow through said measuring pumping means;

the gas sensor further comprising:

a electromotive force-measuring circuit for constantly measuring the electromotive force corresponding to a difference between an amount of oxygen produced by said decomposition of said predetermined gas component and an amount of oxygen contained in a reference gas;

a frequency control means for controlling a frequency of said pulse-shaped current corresponding to a difference between the electromotive force measured by said electromotive force-measuring circuit and a comparing voltage; and

a measuring circuit for at least converting the frequency of the pulse-shaped current into a concentration of said predetermined gas component.

2. (Original) The gas sensor according to claim 1, wherein a resistor is connected in series to a supply line of said pulse-shaped current to said measuring pumping means.

3. (Original) The gas sensor according to claim 2, wherein said resistor is selected or adjusted depending on performance of a sensor element.

4. (Original) The gas sensor according to claim 1, wherein said predetermined gas component is NO<sub>x</sub>.

Claims 5-13 (Canceled).

14. (Original) A method for controlling a gas sensor, the gas sensor comprising:  
a main pumping means for pumping-processing oxygen contained in a measurement gas introduced from external space, comprising solid electrolyte contacting with said external space, and an inner pumping electrode and an outer pumping electrode formed on inner and outer surfaces of said solid electrolyte; and

a measuring pumping means for decomposing a predetermined gas component contained in said measurement gas after being pumping-processed by said main pumping means by the aid of a catalytic action and/or electrolysis, and pumping-processing oxygen produced by said decomposition via said outer pumping electrode of said main pumping means;

wherein a concentration of oxygen is controlled and/or the predetermined gas component is measured by allowing a pulse-shaped current to flow through said measuring pumping means;

wherein the method for controlling the gas sensor comprises the steps of:

measuring constantly the electromotive force corresponding to a difference between an amount of oxygen produced by said decomposition of said predetermined gas component and an amount of oxygen contained in a reference gas;

controlling a frequency of said pulse-shaped current corresponding to a difference between the electromotive force measured by said electromotive force-measuring circuit and a comparing voltage; and

converting at least the frequency of the pulse-shaped current into a concentration of said predetermined gas component.

15. (Original) The method for controlling said gas sensor according to claim 14, wherein said predetermined gas component is NO<sub>x</sub>.

Claims 16-19 (Canceled).